

BDS Technology – Fact Sheet

The Postal Service is committed to keeping its employees and customers safe. To help counter the threat of anthrax in the mail, the Postal Service has developed a Biohazard Detection System (BDS) that will detect anthrax in the mail with high reliability. The system is designed for the highest possible level of detection.

The BDS (Biohazard Detection System) is the first of its kind.

- It performs a rapid, on-site DNA test for anthrax and provides immediate on-site notification.
- The DNA test is conducted in a cabinet linked to a "site controller" computer which can provide an alert if anthrax DNA is detected.

To get a sample into a form that can be tested, the DNA is extracted, concentrated, and purified. Here is a closer look at how the BDS components operate:

- **The hood:** positioned over the Advanced Facer Canceler System (AFCS), collects air samples from the mail stream and transmits them through a hose to the aerosol collector inside the BDS cabinet
- **The aerosol collector:** takes in air samples, concentrates the target particles into a sterile water solution
- **The cartridges:** contain the samples to be tested
- **The cartridge handler:** automates the movement of the cartridges as they are used
- **The PCR (polymerase chain reaction) unit:**
 - A test cartridge containing an aerosol sample and chemical reagents is inserted into the PCR unit.
 - The sample is automatically prepared for testing.
 - The PCR "photocopies" the DNA of the sample and matches the sample DNA against a template.
 - The PCR measures the DNA sequences to confirm a genetic match.
 - The selected PCR module simplifies and reduces the time for all the steps involved in a DNA match.
 - The PCR module allows genetic testing to be completed on-site, outside a laboratory.
- The PCR test can detect anthrax DNA in approximately one hour.
- The aerosol collection and PCR sample testing is fully automated.

The Site Controller computer monitors and controls the testing components in the BDS cabinet.

- The site controller is located in a secure room near the BDS cabinet.
- The site controller records the diagnostics and provides immediate notification of any equipment problems.

The system is designed to be redundant and fail-safe

- All parts of the BDS system are designed to operate without the need for human input or supervision.
- Single points of failure have been eliminated.
- Replacement units are on site.

Chronology of BDS testing:

- June 2002: first prototype BDS system installed in USPS mail facility in Baltimore, operating successfully
- May 2003: 14 test units installed in sites around the country
- July 2003: 30-day testing of all 14 BDS units
- Summer 2003: began evaluating of results of pilot test to create a plan for eventual nationwide rollout

Contractors who are providing BDS equipment:

- Northrop Grumman, Smiths Detection of Edgewood, MD and other team members designed a prototype BDS system that has been in operation in the Baltimore Processing and Distribution Center since June of 2002. The other team members are Cepheid, Inc. of Sunnyvale, CA, and MRI - Midwest Research, Inc. / Sceptor Industries of Kansas City, MO.